



# Shoreline Restoration and Management Plan/ Final Environmental Impact Statement

August 2014







**UNITED STATES DEPARTMENT OF THE INTERIOR  
NATIONAL PARK SERVICE  
SHORELINE RESTORATION AND MANAGEMENT PLAN /  
FINAL ENVIRONMENTAL IMPACT STATEMENT  
Indiana Dunes National Lakeshore, Porter, Indiana  
EXECUTIVE SUMMARY**

The *Shoreline Restoration and Management Plan / Final Environmental Impact Statement* (EIS) has been prepared to provide scientifically-based alternatives for the restoration of natural sediment movement along the southern shore of Lake Michigan within and adjacent to Indiana Dunes National Lakeshore. The purpose of the plan / final EIS is to provide comprehensive guidance for restoring natural shoreline processes, preserving shoreline ecosystems, and providing opportunities for quality visitor experiences at Indiana Dunes National Lakeshore. The intent of the plan / final EIS is not to provide specific and detailed answers to every issue facing the park, but rather to provide a framework to assist National Park Service (NPS) managers, stakeholders, and locals governing bodies in making current and future decisions.

For the purpose of the plan / final EIS the shoreline has been divided into four reaches based on sediment erosion and accretion. Due to the natural process-driven interconnectivity of these areas the final EIS is formatted so that reaches 1 and 2, which extend from Crescent Dune to Willow Lane, and reaches 3 and 4, which extend from Willow Lane to the Gary-U.S. Steel East Breakwater, are discussed in the context of two independent sediment transport cells. The National Park Service will consider a no-action alternative (alternative A) in all reaches as a baseline of current conditions and management practices.

For reaches 1 and 2 seven alternatives were initially developed including the no-action alternative. All alternatives provide for beach nourishment at Crescent Dune differing in the source of material (upland versus dredged),

method of placement (hydraulic versus mechanical), and frequency of placement (every year or every five years). Additionally, one of the alternatives incorporates a permanent bypass system, and another incorporates the construction of a temporary submerged cobble berm. Through a value analysis process the alternative that incorporated the submerged cobble berm was selected as the preferred alternative for reaches 1 and 2 for the plan / draft EIS. This alternative provided the best combination of strategies resulting in a high level of protection of natural resources while providing for a wide range of beneficial uses of the environment. However, public comment on the plan / draft EIS (July 2012) was extensive and ranged from support for the goals of the project to concerns about a number of aspects of the draft alternatives. The public was generally supportive of beach nourishment but there was consistent, negative response to the proposed cobble berm in alternative E (preferred alternative in the draft EIS).

It was determined through the draft EIS process that all alternatives meet park purposes and objectives while protecting park resources by minimizing impacts, and are consistent with the legislative intent of Indiana Dunes National Lakeshore, applicable federal laws, policies, and regulations.

The only variation between the alternatives is in the consistency of the aggregate (sediment/rock), frequency of placement, and method of placement. Therefore a new hybrid alternative was designed that incorporated desired aspects of multiple alternatives, which would meet park purposes and objectives, yet

addresses public concern with the submerged cobble berm.

The criteria critical to the selection of alternative E as the draft EIS preferred alternative for reaches 1 and 2 focused on the restoration of native materials (sediment, gravel, rock) to the shoreline and not necessarily on the method of placement (i.e., creating a submerged berm). The new hybrid alternative would provide the identical materials to the shoreline only through a direct placement process. The majority of material used for beach nourishment would be obtained from fine and medium grained sediments that could be hydraulically dredged (as in alternative C-1). The specific source location of the nourishment material would be determined in coordination with Indiana Department of Natural Resources (IDNR) in areas of accretion so that dredging activities would not disturb areas of equilibrium. The additional gravel and rock component would be obtained by implementing a portion of alternative B-1. Rather than using the inland mined source to provide the entire spectrum of beach nourishment, only the coarse component (gravels and rock), proposed under alternative E, would be hauled to the beach and mixed on-site with the hydraulically dredged sediments. The new hybrid alternative F incorporates the benefit of the gravel and rock materials from alternative E using the inland mined and hauled sources outlined in alternative B-1 with the hydraulically dredged sands outlined in alternative C-1.

For reaches 3 and 4 four alternatives were developed including the no-action alternative. All alternatives provide for beach nourishment at Portage Lakefront and Riverwalk differentiated by the frequency of nourishment (every year or every five years), and one includes the development of a permanent bypass system. Only dredged material was considered for these alternatives, because no viable access to the nourishment site exists for trucking in upland materials. Through a value analysis process the alternative that provides sediment

nourishment material every five years through a combination of mechanical and hydrologic means was selected as the preferred alternative for reaches 3 and 4 in the draft EIS. This alternative is cost efficient and provides the greatest potential for both foredune creation and protection from major storm events. While the public was generally supportive of beach nourishment for reaches 3 and 4, there was negative response to alternative C-5 that provided beach nourishment every five years during the public comment on the plan / draft EIS. In response to the public's concerns, the preferred alternative for reaches 3 and 4 has been changed to alternative C-1 that provides for beach nourishment annually.

The plan / draft EIS was available for public comment for a period of 60 days commencing when the U.S. Environmental Protection Agency published the Notice of Availability in the Federal Register on September 14, 2012. One public meeting was held on October 23, 2012.

A copy of the plan / final EIS is available on the internet on the NPS Planning, Environment, and Public Comment website at: <http://www.parkplanning.nps.gov/indu>. The plan / final EIS can also be accessed through the park's home page at: <http://www.nps.gov/indu>. In addition, a limited number of hardcopies and CDs are available at the Indiana Dunes National National Lakeshore headquarters located at 1100 North Mineral Springs Road in Porter, Indiana. If you have any questions, please call Charles Morris, Environmental Protection Specialist, at 219-983-1352.

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## SUMMARY

### PURPOSE OF AND NEED FOR ACTION

The purpose of this *Shoreline Restoration and Management Plan / Final Environmental Impact Statement* (EIS) is to provide comprehensive guidance for restoring natural shoreline processes, preserving the shoreline ecosystem, and providing opportunities for quality visitor experiences at Indiana Dunes National Lakeshore. The purposes of this plan / final EIS are as follows:

- Ensure that the foundation for decision-making has been developed in consultation with the public and is adopted by NPS leadership after sufficient analysis of the benefits and impacts of alternative courses of action.
- Develop strategies that would support the reestablishment of more sustainable shoreline sediment movement and a more natural ecosystem of shoreline vegetation, foredune and dune complexes.
- Define desired resource conditions for the shoreline, foredunes and dunes.
- Identify approaches for shoreline restoration and management that are consistent with a regional approach to management of the lakeshore that encourages maintenance of a natural shoreline and functioning ecosystems.

Prior to industrial and residential development along Lake Michigan, the shoreline was comprised of a highly diverse landscape including swamp and marsh lands, dunes, oak savanna, and prairies. The natural shoreline processes along southern Lake Michigan have been heavily impacted by the construction of numerous navigational harbors and hardened (man-made) structures that have greatly affected the integrity and sustainability of the natural landscape. These structures altered Lake Michigan's natural littoral drift, resulting in areas of sediment accretion (accumulation) east (updrift) of Michigan City and the Port of Indiana, and sediment starvation to the west (downdrift) of

these same harbors. The lack of continued sediment replenishment from natural littoral drift has resulted in extensive beach and dune erosion which threatens both public and private resources. Although the U.S. Army Corps of Engineers (COE) conducts beach nourishment on an intermittent basis and the staff at Indiana Dunes National Lakeshore conduct certain resource management actions to protect resources (such as sensitive plant and animal habitats), no specific shoreline restoration plan exists, and the impact of severe shoreline and beach erosion would compromise the park's outstanding ecological and biological diversity found within its boundaries. This plan / final EIS is needed to:

- Address the severe shoreline and beach erosion and the impacts on dune ecology that are caused by interruptions to the natural processes along the shoreline, including the movement of sediment.
- Address the adverse impacts to the fragile shoreline ecosystem caused by the interrupted natural processes and sediment movement.
- Identify a series of management actions that can be implemented by park staff, as needed, to provide a balance between protection of the shoreline ecosystem and appropriate visitor enjoyment of the park.

### OBJECTIVES IN TAKING ACTION

Objectives define what must be achieved for an action to be considered a success. Alternatives selected for detailed analysis must meet all objectives and must also resolve the purpose of and need for action.

Using the park's enabling legislation, mandates, and direction in other planning documents as well as NPS service-wide objectives, NPS *Management Policies 2006*, and the NPS *Organic Act of 1916*, the staff of Indiana Dunes National Lakeshore identified

the following management objectives relative to shoreline management at the park.

### **Shoreline Restoration**

- Develop strategies that would support the reestablishment of more sustainable shoreline sediment movement and a more natural ecosystem of shoreline vegetation, foredune and dune complex.

### **Exotic and Invasive Species**

- Develop strategies to identify, manage, and remove aquatic and terrestrial nonnative and invasive species.
- Develop strategies to support ongoing management efforts to remove aquatic and terrestrial nonnative and invasive species, and to prevent conditions detrimental to those efforts.

### **Management Methodology**

- Determine shoreline desired conditions that would serve as thresholds for management actions within Indiana Dunes National Lakeshore.
- Develop and implement an adaptive management approach for maintaining a sustainable shoreline ecosystem within Indiana Dunes National Lakeshore.

## **ALTERNATIVES CONSIDERED**

For the purpose of this plan / final EIS, the shoreline has been divided into four reaches based on accretion and erosion rates. Proposed alternatives are presented for reaches 1 and 2 and reaches 3 and 4. Under all proposed action alternatives, the sediment used for beach nourishment would be compatible with native site sediment, meaning similar in terms of color, shape, size, mineralogy, compaction, organic content, and texture. Beach nourishment material would be free of harmful chemical contaminants, trash,

debris, and large pieces of organic material. Placement of the nourishment material would be conducted in a manner to avoid or minimize potential impacts on both natural resources and visitors of the park. The alternatives considered addressed the public's main concerns of protecting habitat, maintaining a natural viewshed, and not causing additional disruptions to sediment movement in the area.

Once this plan is completed, several of the nourishment activities proposed under the alternatives could be implemented without further compliance or study. Other more detailed studies and plans would be needed before some specific actions could be implemented, including design specifications. These additional plans and studies would include an in-depth analysis of potential impacts.

### **Reaches 1 and 2**

The National Park Service would continue current management practices. For the foreseeable future, there would be no new actions taken to restore the park shoreline. For reaches 1 and 2 seven alternatives were developed including the no-action alternative. All alternatives provide for beach nourishment at Crescent Dune differing in the source of material (upland versus dredged), method of placement (hydraulic versus mechanical), and frequency of placement (every year or every five years). Additionally, one of the alternatives incorporates a permanent bypass system, and another incorporates the construction of a temporary submerged cobble berm. Through a value analysis process the alternative that incorporated the submerged cobble berm was selected as the preferred alternative for reaches 1 and 2. This alternative provided the best combination of strategies resulting in a high level of protection of natural resources while providing for a wide range of beneficial uses of the environment.



Public involvement and comment on the plan / draft EIS was extensive, ranging from support to concern with various aspects of the alternatives presented. While the public was generally supportive of beach nourishment, there was consistent, negative response to the submerged cobble berm. Therefore the National Park Service chose to review the array of alternatives to determine the feasibility of both satisfying public concern and achieving the project goals through the development of a new hybrid alternative.

A new hybrid alternative was developed for reaches 1 and 2 that incorporates the full range of native materials using an approach other than the submerged berm would achieve the same objectives. The majority of material used for beach nourishment would be obtained from fine and medium grained sediments that would be hydraulically dredged. The additional gravel and rock component would be obtained from an upland source. Thus, a new hybrid alternative was created as the new preferred alternative for reaches 1 and 2.

### **Reaches 3 and 4**

The National Park Service would continue current management practices. For the foreseeable future, there would be no new actions taken to restore the park shoreline. For reaches 3 and 4 four alternatives were developed including the no-action alternative. All alternatives provide for beach nourishment at Portage Lakefront and Riverwalk differentiated by the frequency of nourishment (every year or every five years), and one includes the development of a permanent bypass system. Only dredged material was considered for these alternatives, because no viable access to the nourishment site exists for trucking in upland materials. Through a value analysis process the alternative that provides sediment nourishment every five years through a combination of mechanical and hydrologic means was selected as the preferred alternative for reaches 3 and 4. This

alternative is cost efficient and provides the greatest potential for both foredune creation and protection from major storm events. However, in response to public concerns related to the large volume of material that would be placed on the beach under the preferred alternative the frequency of placement was changed from every five years to annual beach nourishment activities. The preferred alternative for reaches 3 and 4 is now alternative C-1.

### **Terrestrial Management Actions**

In addition to the shoreline restoration alternatives, natural resource management strategies are proposed for the protection and improvement of the park's terrestrial ecosystem. Plant communities and physiography are continually changing with the disturbance-prone habitats of the foredune complex. The foredune and dune complex encourages biological diversity unique to this region of the country. Migratory bird habitat, intradunal wetlands, and the various stages of dune succession are critical components of the park. The National Park Service is responsible for the protection of these sensitive habitats. Protection is currently accomplished with the following management strategies:

- preservation or restoration of sensitive habitat
- management of nonnative invasive plant species
- reduction of anthropogenic influences on native dune vegetation and critical habitat

### **ENVIRONMENTAL CONSEQUENCES**

The analysis of environmental consequences considers the actions being proposed and the cumulative effects from occurrences inside and outside Indiana Dunes National Lakeshore. The analysis addresses the potential environmental consequences of the actions for coastal processes, including

## SUMMARY

sediment transport and dune formation, aquatic fauna, terrestrial habitat, threatened and endangered species and species of concern, wetlands and pannes, soundscape, visitor experience, and park operations.

In analyzing the impacts on natural resources, all action alternatives would benefit coastal processes. There would be adverse effects on aquatic fauna, terrestrial habitat, threatened and endangered species and species of concern, and soundscape as a result of activities associated with the placement of nourishment material. The duration and intensity of these effects would vary depending on the source of the nourishment material (i.e., upland or dredged) and the volume of nourishment material proposed under each alternative. Under the NPS

preferred alternative (alternative F) in reaches 1 and 2, effects on all resources would be no greater than moderate and adverse. Under the NPS preferred alternative (alternative C-1) in reaches 3 and 4, effects would be no greater than short-term, minor, and adverse on all resources.

However, under all the action alternatives, the impacted resources (e.g., coastal processes, aquatic fauna, terrestrial habitat, threatened and endangered species and species of concern, and soundscape) would benefit in the long term from the reduction of severe shoreline and beach erosion and the creation of a more natural ecosystem of shoreline vegetation and foredune and dune complexes and processes.



## CONTENTS

### SUMMARY III

- Purpose of and Need for Action iii
- Objectives in Taking Action iii
- Alternatives Considered iv
- Environmental Consequences v

### ACRONYMS XV

### A GUIDE TO THIS DOCUMENT XVI

## CHAPTER 1: PURPOSE AND NEED FOR ACTION

### INTRODUCTION 3

### PURPOSE AND NEED FOR THE PLAN 5

- Purpose 5
- Need 5
- Goals and Objectives for Taking Action 5

### PROJECT LOCATION 7

### PARK BACKGROUND 13

- History of Indiana Dunes National Lakeshore 13
- Overview of the Park's Ecosystem 13
- Indiana Dunes National Lakeshore's Purpose and Significance 13

### RELATIONSHIP OF PARK PLANNING DOCUMENTS TO OTHER GUIDING LAWS, POLICIES, PLANS, AND CONSTRAINTS 15

- Federal Laws and Orders 15
- NPS Laws, Policies, and Guidance 15
- Park Planning Documents for Indiana Dunes National Lakeshore 18
- Other Planning Documents for Southern Lake Michigan 20

### PROPOSED PLAN FOR IMPLEMENTATION 21

### ISSUES AND IMPACT TOPICS 22

- Planning Issues and Impact Topics 22
- Impact Topics Retained for Detailed Analysis 23
- Impact Topics Dismissed from Further Consideration 25

## **CHAPTER 2: THE ALTERNATIVES**

### **INTRODUCTION 33**

### **PROJECT AREA DEFINITION 34**

### **ALTERNATIVES DEVELOPMENT PROCESS 39**

- Technical Analysis 39
- Formulation of the Alternatives 40
- Needed Future Studies and Plans 40
- Choosing by Advantage Process 45
- Selection of Alternatives for Implementation 46
- Restoration Metrics and Desired Conditions 47
- Approaches to Adaptive Management 48

### **MITIGATION MEASURES COMMON TO ALL ACTION ALTERNATIVES 50**

- Mined Nourishment Material 50
- Natural Resources 50
- Cultural Resources 53
- Visitor Experience 54
- Hazardous Materials 54
- Human Health Concerns 54

### **SHORELINE AND BEACH COMPLEX, REACHES 1 AND 2 55**

- Alternative A: No-action 55
- Alternative B-1: Beach Nourishment via Upland Sources, Annual Frequency 56
- Alternative B-5: Beach Nourishment via Upland Sources, Five-Year Frequency 56
- Alternative C-1: Beach Nourishment via Dredged Sources, Annual Frequency 57
- Alternative C-5: Beach Nourishment via Dredged Sources, Five-Year Frequency 58
- Alternative D: Beach Nourishment via Permanent Bypass System 61
- Alternative E: Submerged Cobble Berm and Beach Nourishment, Annual Frequency 61
- Alternative F: Beach Nourishment, Annual Frequency with a Mix of Small Natural Stone at the Shoreline (Preferred Alternative) 62

### **SHORELINE AND BEACH COMPLEX, REACHES 3 AND 4 67**

- Alternative A: No-action 67
- Alternative C-1: Beach Nourishment via Dredged Sources, Annual Frequency (Preferred Alternative) 68
- Alternative C-5: Beach Nourishment via Dredged Sources, Five-Year Frequency 71
- Alternative D: Beach Nourishment Via Permanent Bypass System 72

### **FOREDUNE AND DUNE COMPLEX 77**

- Foredune and Dune Complex, Reach 1 78
- Foredune and Dune Complex, Reach 2 79
- Foredune and Dune Complex, Reach 3 80
- Foredune and Dune Complex, Reach 4 81

### **ACTIONS AND ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION 83**

- Reach 3, Beach Nourishment via Upland Sources 83
- Reach 3, Engineered Structures 83

NATIONAL PARK SERVICE PREFERRED ALTERNATIVES	85
ENVIRONMENTALLY PREFERABLE ALTERNATIVES	86
CONSISTENCY OF THE ALTERNATIVES WITH THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969, AS AMENDED	88
HOW ALTERNATIVES MEET OBJECTIVES	90

## CHAPTER 3: AFFECTED ENVIRONMENT

INTRODUCTION	107
Indiana Dunes National Lakeshore Background	107
Hydrogeologic Setting	107
Climate Change	107
COASTAL PROCESSES	110
Sediment Transport Processes	110
Dune Formation Processes	111
AQUATIC FAUNA	112
The Nearshore Environment	112
Native Species	112
Invasive and Nonnative Species	114
TERRESTRIAL HABITAT	117
Native Plant Communities	117
Invasive and Nonnative Plant Communities	122
Terrestrial Invertebrates, Birds, Amphibians and Reptiles, and Mammals	125
THREATENED AND ENDANGERED SPECIES AND SPECIES OF CONCERN	127
Vascular Plants	127
Terrestrial Invertebrates	128
Birds	128
Amphibians and Reptiles	129
Mammals	129
WETLANDS AND PANNES	131
Aquatic Communities	131
Pannes	131
SOUNDSCAPE	133
VISITOR EXPERIENCE	134
PARK OPERATIONS	137



## CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

### INTRODUCTION 141

General Methodology for Establishing Impact Thresholds and Measuring Effects by Resource 141

Impact Thresholds 142

Cumulative Effects Analysis Method 142

Cumulative Impact Scenario 143

### COASTAL PROCESSES 146

Methodology 146

Shoreline and Beach Complex, Reaches 1 and 2 146

Alternative A (No-action Alternative) 146

Alternative B-1 (Beach Nourishment via Upland Sources, Annual Frequency) 147

Alternative B-5 (Beach Nourishment via Upland Sources, Five-Year Frequency) 148

Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) 149

Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency) 150

Alternative D (Beach Nourishment via Permanent Bypass System) 151

Alternative E (Submerged Cobble Berm and Beach Nourishment, Annual Frequency) 152

Alternative F (Beach Nourishment, Annual Frequency with a Mix of Small Natural Stone at the Shoreline) – Preferred Alternative 153

Shoreline and Beach Complex, Reaches 3 and 4 154

Alternative A (No-action Alternative) 154

Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) – Preferred Alternative 155

Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency) 156

Alternative D (Beach Nourishment via Permanent Bypass System) 157

Foredune and Dune Complex, Reaches 1 through 4 158

### AQUATIC FAUNA 160

Methodology 160

Shoreline and Beach Complex, Reaches 1 and 2 160

Alternative A (No-action Alternative) 160

Alternative B-1 (Beach Nourishment via Upland Sources, Annual Frequency) 162

Alternative B-5 (Beach Nourishment via Upland Sources, Five-Year Frequency) 164

Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) 165

Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency) 166

Alternative D (Beach Nourishment via Permanent Bypass System) 167

Alternative E (Submerged Cobble Berm and Beach Nourishment, Annual Frequency) 168

Alternative F (Beach Nourishment, Annual Frequency with a Mix of Small Natural Stone at the Shoreline) – Preferred Alternative 170

Shoreline and Beach Complex, Reaches 3 and 4 171

Alternative A (No-action Alternative) 171

Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) – Preferred Alternative 173

Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency) 175

Alternative D (Beach Nourishment via Permanent Bypass System) 176

Foredune and Dune Complex, Reaches 1 through 4	177
<b>TERRESTRIAL HABITAT</b>	<b>179</b>
Methodology	179
Shoreline and Beach Complex, Reaches 1 and 2	179
Alternative A (No-action Alternative)	179
Alternative B-1 (Beach Nourishment via Upland Sources, Annual Frequency)	181
Alternative B-5 (Beach Nourishment via Upland Sources, Five-Year Frequency)	182
Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency)	183
Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency)	184
Alternative D (Beach Nourishment via Permanent Bypass System)	185
Alternative E (Submerged Cobble Berm and Beach Nourishment, Annual Frequency)	186
Shoreline and Beach Complex, Reaches 3 and 4	188
Alternative A (No-action Alternative)	188
Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) – Preferred Alternative	189
Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency)	190
Alternative D (Beach Nourishment via Permanent Bypass System)	191
Foredune and Dune Complex, Reaches 1 through 4	192
<b>THREATENED AND ENDANGERED SPECIES AND SPECIES OF CONCERN</b>	<b>195</b>
Methodology	195
Shoreline and Beach Complex, Reaches 1 and 2	196
Alternative A (No-action Alternative)	196
Alternative B-1 (Beach Nourishment via Upland Sources, Annual Frequency)	197
Alternative B-5 (Beach Nourishment via Upland Sources, Five-Year Frequency)	197
Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency)	198
Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency)	199
Alternative D (Beach Nourishment via Permanent Bypass System)	199
Alternative E (Submerged Cobble Berm and Beach Nourishment, Annual Frequency)	200
Alternative F (Beach Nourishment, Annual Frequency with a Mix of Small Natural Stone at the Shoreline) – Preferred Alternative	201
Shoreline and Beach Complex, Reaches 3 and 4	202
Alternative A (No-action Alternative)	202
Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) – Preferred Alternative	203
Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency)	204
Alternative D (Beach Nourishment via Permanent Bypass System)	205
Foredune and Dune Complex, Reaches 1 through 4	205
<b>WETLANDS AND PANNES</b>	<b>208</b>
Methodology	208
Shoreline and Beach Complex, Reaches 1 through 4	208
Foredune and Dune Complex, Reaches 1 through 4	209

## **SOUNDSCAPE 211**

Methodology 211

Shoreline and Beach Complex, Reaches 1 and 2 211

Alternative A (No-action Alternative) 211

Alternative B-1 (Beach Nourishment via Upland Sources, Annual Frequency) 212

Alternative B-5 (Beach Nourishment via Upland Sources, Five-Year Frequency) 214

Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) 214

Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency) 215

Alternative D (Beach Nourishment via Permanent Bypass System) 216

Alternative E (Submerged Cobble Berm and Beach Nourishment, Annual Frequency) 217

Alternative F (Beach Nourishment, Annual Frequency with a Mix of Small Natural Stones at the Shoreline) – Preferred Alternative 218

Shoreline and Beach Complex, Reaches 3 and 4 219

Alternative A (No-action Alternative) 219

Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) – Preferred Alternative 219

Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency) 220

Alternative D (Beach Nourishment via Permanent Bypass System) 221

Foredune and Dune Complex, Reaches 1 through 4 221

## **VISITOR EXPERIENCE 223**

Methodology 223

Shoreline and Beach Complex, Reaches 1 and 2 223

Alternative A (No-action Alternative) 223

Alternative B-1 (Beach Nourishment via Upland Sources, Annual Frequency) 224

Alternative B-5 (Beach Nourishment via Upland Sources, Five-Year Frequency) 225

Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) 225

Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency) 226

Alternative D (Beach Nourishment via Permanent Bypass System) 227

Alternative E (Submerged Cobble Berm and Beach Nourishment, Annual Frequency) 228

Alternative F (Beach Nourishment, Annual Frequency with a Mix of Small Natural Stone at the Shoreline) – Preferred Alternative 229

Shoreline and Beach Complex, Reaches 3 and 4 230

Alternative A (No-action Alternative) 230

Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) – Preferred Alternative 231

Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency) 232

Alternative D (Beach Nourishment via Permanent Bypass System) 233

Foredune and Dune Complex, Reaches 1 through 4 233

## **PARK OPERATIONS 236**

Methodology 236

Shoreline and Beach Complex, Reaches 1 and 2 236

Alternative A (No-action Alternative) 236

Alternative B-1 (Beach Nourishment via Upland Sources, Annual Frequency) 237

Alternative B-5 (Beach Nourishment via Upland Sources, Five-Year Frequency) 238

Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) 238



Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency)	239
Alternative D (Beach Nourishment via Permanent Bypass System)	240
Alternative E (Submerged Cobble Berm and Beach Nourishment, Annual Frequency)	240
Alternative F (Beach Nourishment, Annual Frequency with a Mix of Small Natural Stone at the Shoreline) – Preferred Alternative	241
Shoreline and Beach Complex, Reaches 3 and 4	242
Alternative A (No-action Alternative)	242
Alternative C-1 (Beach Nourishment via Dredged Sources, Annual Frequency) – Preferred Alternative	243
Alternative C-5 (Beach Nourishment via Dredged Sources, Five-Year Frequency)	243
Alternative D (Beach Nourishment via Permanent Bypass System)	244
Foredune and Dune Complex, Reaches 1 through 4	245
<b>SUMMARY OF IMPACT ANALYSIS</b>	<b>247</b>
Unavoidable Adverse Impacts	247
Irreversible and Irretrievable Commitments of Resources	249
Relationship of Short-Term Use and Long-Term Productivity	250
<b>CHAPTER 5: CONSULTATION AND COORDINATION</b>	
<b>PUBLIC INVOLVEMENT, INCLUDING SCOPING</b>	<b>255</b>
Public Scoping Meetings	255
<b>COOPERATING AGENCIES</b>	<b>258</b>
<b>CONSULTATION AND COORDINATION TO DATE WITH OTHER AGENCIES, OFFICES, AND TRIBES</b>	<b>259</b>
Federal Agencies	259
State Agencies	259
American Indian Tribes	260
<b>LIST OF RECIPIENTS OF PLAN / SHORELINE RESTORATION AND MANAGEMENT PLAN / FINAL ENVIRONMENTAL IMPACT STATEMENT</b>	<b>261</b>
Federal Departments and Agencies	261
State Agencies	261
County and Local Agencies	261
Organizations and Businesses	261
American Indian Tribes and Agencies	262
Public Review of Plan / Draft EIS	262
<b>PREPARERS AND CONSULTANTS</b>	<b>263</b>
National Park Service	263
Consultants	263

## **SELECTED BIBLIOGRAPHY, INDEX, GLOSSARY, AND APPENDIXES**

**SELECTED BIBLIOGRAPHY 267**

**INDEX 275**

**GLOSSARY 277**

**APPENDIX A: ENABLING LEGISLATION 283**

**APPENDIX B: AGENCY CONSULTATION 317**

**APPENDIX C: TECHNICAL REFERENCES 341**

**APPENDIX D: SPECIES LISTS 393**

**APPENDIX E: CONCERN RESPONSE REPORT 441**

### **Figures**

Figure 2-1. Shoreline Reaches 37

Figure 2-2. Shoreline Comparison 41

Figure 2-3. Shoreline Erosion and Accretion Zones 43

Figure 2-4. Alternatives for Shoreline and Beach Complex, Reaches 1 and 2 59

Figure 2-5. Alternative F: Beach Nourishment, Annual Frequency with a Mix of Small Natural Stone at Shoreline (Preferred Alternative) for Reaches 1 and 2 65

Figure 2-6. Alternatives for Shoreline and Beach Complex, Reaches 3 and 4 69

Figure 2-7. Alternative C-1: Beach Nourishment via Dredged Sources, Annual Frequency (Preferred Alternative) for Reaches 3 and 4 75

Figure 3-1. Sensitive Habitats 123

Figure 3-2. Visitor Access Points and Areas of Concentrated Use 135

### **Maps**

Map 1-1. Park Map 9

Map 1-2. Project Area Map 11

Map 3-1. Map of the Natural Regions of Indiana Cropped to Show Northwest Indiana 119

### **Tables**

Table 1-1. Annual Greenhouse Gas Emissions 26

Table 2-1. Desired Conditions 47

Table 2-2A. Comparison of Alternatives, Reaches 1 and 2 91

Table 2-2B. Comparison of Alternatives, Reaches 3 and 4 95

Table 2-3. Reaches 1 and 2 Alternatives Impacts Table 97

Table 2-4. Reaches 3 and 4 Alternatives Impacts Table 103

## Acronyms

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
CSSC	Chicago Sanitary and Ship Canal
CZMA	Coastal Zone Management Act
dBA	A-weighted decibel
<i>E. coli</i>	<i>Escherichia coli</i>
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ft./yr.	feet per year
FWS	U.S. Fish and Wildlife Service
GHG	greenhouse gas
IDNR	Indiana Department of Natural Resources
LIDAR	Light Detection and Ranging
LWD	Low Water Datum
m <sup>3</sup>	cubic meters
mtCO <sub>2</sub> e	metric tons of carbon dioxide equivalent
NEPA	National Environmental Policy Act of 1969, as amended
NHPA	National Historic Preservation Act, as amended
NIPSCO	Northern Indiana Public Service Company
NPS	National Park Service
PEPC	Planning Environment and Public Comment
SHPO	state historic preservation officer
U.S.	United States
USC	United States Code
USGS	U.S. Geological Survey
yd <sup>3</sup>	cubic yards



## A GUIDE TO THIS DOCUMENT

This *Shoreline Restoration and Management Plan / Draft Environmental Impact Statement* (EIS) is organized into five chapters plus appendixes. Each section is described briefly below.

The “Purpose and Need for Action” chapter describes the context for the entire final EIS. It explains why this plan is being prepared and what issues it addresses. It provides guidance (e.g., park purpose, significance, resources and values, special mandates, and service-wide laws and policies) for the alternatives that are considered. The “Purpose and Need for Action” chapter also describes how this plan relates to other plans and projects and identifies impact topics to be discussed relative to the no-action alternatives. It also includes a discussion of impact topics that were dismissed from detailed analysis.

“The Alternatives” chapter discusses management zones and the management alternatives. Mitigating measures for minimizing or eliminating impacts of some proposed actions are presented. A section on the selection of the preferred alternative and environmentally preferable alternative follows.

The “Affected Environment” chapter describes areas and resources that would be affected by actions that are part of the various alternatives — including coastal processes, aquatic fauna, terrestrial habitat, threatened and endangered species and species of concern, wetlands and pannes, soundscape, visitor experience, and park operations.

The “Environmental Consequences” chapter analyzes the impacts of implementing the alternatives. Approaches used to assess impacts are outlined at the beginning of the “Environmental Consequences” chapter.

The “Consultation and Coordination” chapter describes the history of public and agency coordination during the planning effort; it also lists agencies and organizations that will receive copies of the final EIS.

The appendixes present information on enabling legislation, technical references, species lists, and initial agency consultation.